

# Association among Nursing courses: Computer, Communication Skills, and Epidemiology at Tobruk University

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## ABSTRACT

The nursing profession is dynamic and requires interdisciplinary practice to acquire essential knowledge and skills, emphasizing the importance of a wide range of skills. This study investigated the associations among three courses in the College of Nursing at Tobruk University. The study comprises Computer, Communication Skills, and Epidemiology offered in their 3<sup>rd</sup> year. Correlational analysis was conducted using data from three academic years (2021-2022, 2022-2023, and 2023-2024). The results revealed significant positive correlations between all three courses, indicating a strong interrelationship. The highest association appeared between Communication Skills and Epidemiology ( $r=0.725$ ) across all AY. Despite varying mean scores albeit appearing to be increasing across the years, the overall pattern of positive associations persisted. The findings suggest that these three essential skills should be included in a thorough nursing education to prepare students for the demands of the profession. Curriculum adjustment and interactive teaching methods are recommended to further students' academic and professional skills.

**Keywords:** Nursing courses; Communication skills; Computer; Epidemiology; Nursing informatics; Nursing skills; Interdisciplinary practice; Essential knowledge; Associations; Interrelationship.

## 1. Introduction

The nursing profession is a dynamic field of study. Requiring interdisciplinary discipline to acquire the knowledge and skills essential to the practice [1] a wide range of skills should be brought into attention. Health care, in retrospect, focused on physician, nurse, and other allied healthcare provider triads primarily [2]. This practice has broad separation of duty; however, alienation was a possibility. With a wide range of disciplines present in the hospital and health care nowadays, it is a necessity to understand each other's duty to provide the best care to patients. Drawing upon the strength of one another's skills in healthcare settings can promote person-centered care [3, 4]. What better way to do it than with proper communication [5]. Knowledge and technological adaptation can also help speed up the process of delivering care to the patient. Computer skills, in particular nursing informatics lead to great contributions on patient safety, and quality of healthcare, as well as reducing healthcare expenses [6]. On another note, the nursing field also was involved in public health. With the recent strike of the global pandemic highlighting the significance of nursing care [7], nurses must also be more involved in epidemiologic studies.

Three courses offered in the College of Nursing (CON) at Tobruk University, despite not being a focal point in nursing procedures, offer side skills necessary for nursing students and practicing nurses' upbringing. Computer, or in the curriculum known as Introduction to Computer with Nursing Informatics, offers the students to learn and enhance technological skills that would help them handle hospital systems in the future. Electronic health records and clinical decision support systems among other nursing informatics systems [8] can be easily grasped if students are exposed to word processing, spreadsheets, databases, presentations, and graphics software. [9] Believed that computer-generated software used in medical and nursing schools was effective at developing among other things psychomotor skills, knowledge, and clinical reasoning of users/students. Thus not only a tool to use for clerical duty

but a form of educational tool with a focus on nursing skills as well. Hence a trend exists in education and health care workforce at some point for nursing informatics [10]. This is without the hassle of patient safety threats [11], underlining the numerous benefits of computer skills and computer-based learning [12].

It's a no-brainer that communication plays a huge role in any work requiring cooperation. Several studies noted that communication along with education was considered a barrier to collaborative effectiveness in different professions [3, 13]. Stemming from misconceptions or in this case misinterpretation [14, 15], communication skills must be possessed by a nursing professional to avoid such discomfort. CON offers communication Skills course on top of English Language to learn how to communicate properly. In this particular study, Communication Skills 3 will be used, a course with a focus on public speaking and presentation skills. Clinical practice crises in allied medical health due to the pandemic have caused different agencies to ensure and evaluate competencies that must be aligned and enough to handle such situations [16]. Another course, gaining traction during and after COVID-19 is Epidemiology. Currently widely used in public health and clinical research using biostatistician methods [17], the study of epidemiology preferably involves skills in computer and communication to be performed properly.

Since the nursing profession demands a well-rounded skill set that may include technical aptitude, effective communication, and understanding of public health principles, study on Computer, Communication Skills and Epidemiology courses were considered for study exploration. This study aims to find the correlation among the three courses within the nursing program at Tobruk University. Specifically, the research will find the significance of the association and present a graphical view of the courses involved in the study. This study is also intended to find out if students are cut out to perform the three different skills on top of their nursing skills.

## 2. Materials and Methods

The study employed correlational analysis among the three independent variables spread across three academic years. The academic records of nursing students at Tobruk University who have taken Computer from the 1st semester and Communication Skills 3 and Epidemiology course from the 2nd semester from academic years (A.Y.) 2021-2022 up to 2023-2024 were used in the study. The three courses were compared with one another to determine their correlation coefficient.

### 2.1. Sample and Sampling Method

The study population was 3<sup>rd</sup> year nursing students at their respective A.Y. at the university. The sample size was determined through purposive sampling. There are a total of 153 students spread across the school year mentioned.

### 2.2. Data collection and extraction

Collection of data was gathered from the Registrar's Office. A simple query command was performed from the database of TUCON-GSv2 [18] to extract relevant records. Data were treated with preprocessing and cleaning methods before data measurements were performed.

### 2.3. Inclusion and exclusion criteria

The 3<sup>rd</sup> year students of A.Y. 2021-2022, 2022-2023, and 2023-2024 were numbered 49, 36 and 68 respectively. It

covers 1<sup>st</sup> and 2<sup>nd</sup> semesters which included both passing and failing scores. All three courses about the study variables must have been taken by students to be considered eligible for inclusion. Those that not meet the criteria were excluded from the study.

## 2.4. Data measures

The collected data were presented in tables. Pearson product-moment correlation coefficient was used to find the association between Computer and Communication Skills 3, Computer and Epidemiology, Communication Skills 3, and Epidemiology. The statistical measurements were performed using Mini Tab version 17 while graphical presentations were done in MS Excel.

## 2.5. Data Analysis

To determine the strength and direction of the relationship, the Pearson product-moment correlation coefficient was used between each set of paired variables. Statistical significance was determined at  $p < 0.05$ .

## 2.6. Ethical Considerations

The study was conducted with ethical principles followed. This includes informed consent, data confidentiality, and anonymity of the participants involved in the study. University and research ethics guidelines were considered and followed in data gathering and analysis.

## 3. Results

Table 1 shows the correlation among the A.Y. 2021-2022 courses. It shows that Communication Skills 3 and Epidemiology have the highest correlation ( $r=0.781702$ ) among the set of variables indicating a significant and high positive correlation.

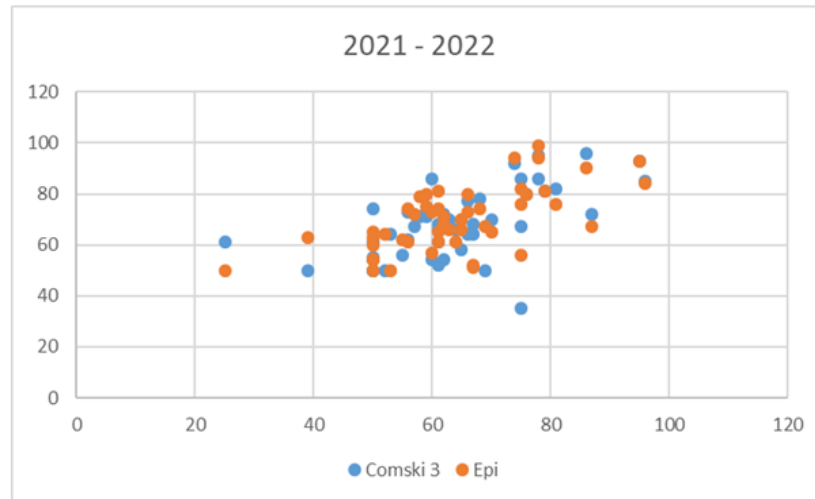
Despite a moderate  $r$  of 0.597592, Computer and Communication Skills possessed a moderate positive correlation and significant relationship. Computer to Epidemiology also recorded a significant moderate positive correlation.

This indicates that the students performing well in one course might be performing well in the other two courses as well. The highest mean was found in Epidemiology (69.857) while the lowest albeit slightly was computed from Computer (64.122) course.

**Table 1.** Association among 2021-2022 courses

Association	Mean (n=49)	r	p-value
Computer – Communication Skills	64.122 – 68.163	0.597592	0.000006
Computer – Epidemiology	64.122 – 69.857	0.63769	<0.000001
Communication Skills – Epidemiology	68.163 – 69.857	0.781702	<0.000001

The scatter plot representing the association of the Computer course to the other two variables shows a positive correlation. Some outliers might have contributed to the lower  $r$  value as can be seen from figure 1.



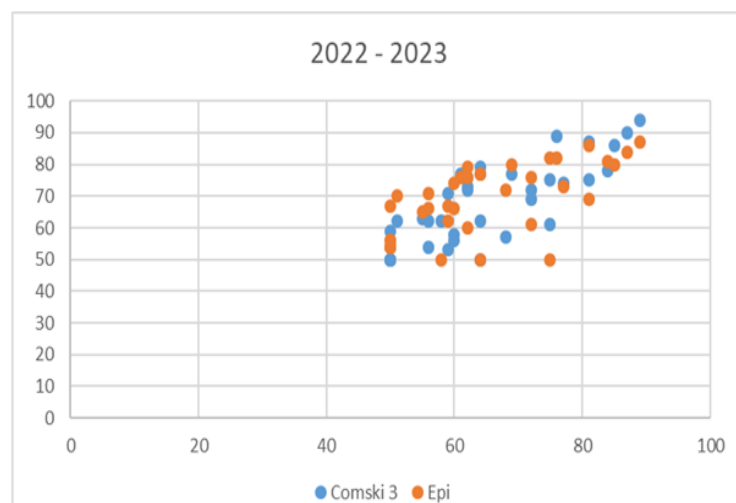
**Figure 1.** Scatter plot for 2021 - 2022

A slight improvement of mean was observed from the Computer (65.111) course shown in Table 2, as compared to the previous A.Y. The highest correlation was observed from the association of Computer and Communication Skills ( $r=0.802483$ ) with a significant relationship found ( $p<0.000001$ ). Results show that the  $r$  and  $p$  values indicated that there is a significant high positive relationship among the three sets of variables except for Computer to Epidemiology ( $r=0.630721$ ) with a significant moderate positive correlation.

**Table 2.** Association among 2022-2023 courses

Association	Mean (n=36)	r	p-value
Computer – Communication Skills	65.111 – 67.417	0.802483	<0.000001
Computer – Epidemiology	65.111 – 69.167	0.630721	0.000037
Communication Skills – Epidemiology	67.417 – 69.167	0.787599	<0.000001

Despite fewer students ( $n=36$ ) in the A.Y. 2022-2023 courses compared to the previous A.Y. the mean value was almost the same. Additionally, the number of outliers was lesser as shown in Figure 2, but this might be because of the lower sample size.



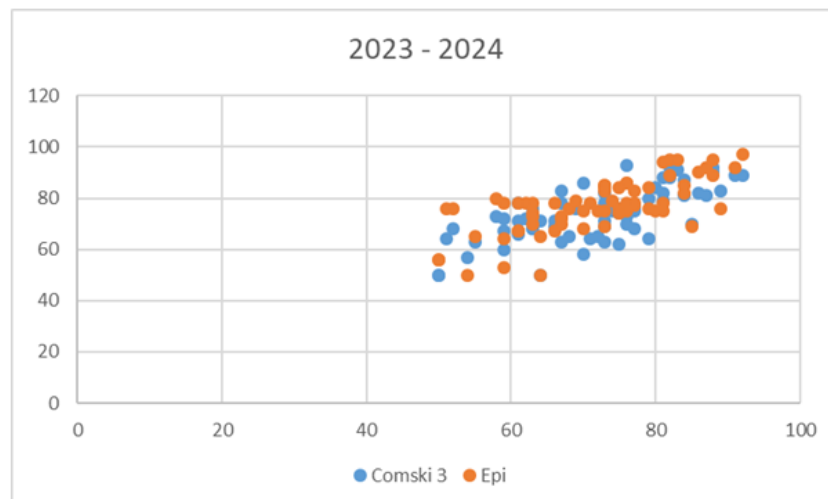
**Figure 2.** Scatter plot for 2022 - 2023

Among the three A.Y., the association among 2023-2024 courses recorded the highest mean, where Computer (71.691), Communication Skills (73.794), and Epidemiology (76.853) also have the most consistent correlation ( $r > 0.70$ ) showing significant high positive correlation seen on table 3. The marked improvement was also notable as the number of students ( $n=68$ ) also increased.

**Table 3.** Association among 2023-2024 courses

Association	Mean (n=68)	r	p-value
Computer – Communication Skills	71.691 – 73.794	0.704971	<0.000001
Computer – Epidemiology	71.691 – 76.853	0.709266	<0.000001
Communication Skills – Epidemiology	73.794 – 76.853	0.725406	<0.000001

Despite having the highest n among the three batches, the graph (figure 3) shows fewer outliers and a smoother scatter plot.



**Figure 3.** Scatter plot for 2023 - 2024

#### 4. Discussion

Overall, the result shows strong association through correlation across the three batches. It revealed a positive correlation where the student who performed well in one course, most likely will perform well in another course. This is consistent with correlational study previously performed on Libyan nursing students at Tobruk University [19, 20]. This strong association displays the significance of a well-rounded nursing education that incorporates these three skills. There are mostly high positive correlations among the three courses, similar to previous studies indicating that performers in one course tend to excel in the others as well. This could also mean based on the result that most students can perform the three different skills on top of their nursing skills.

The strongest pair appears to be between Communication Skills and Epidemiology ( $r > 0.725$ ) as evidenced by topping all but the 2022-2023 batch ( $r=0.787599$  against the highest  $r=0.802483$ ), notwithstanding trailing by a few notches only. According to the study of [21] Epidemiology is collaborative and multidisciplinary, thus teamwork and communication are critical components for its successful operation. Although may be impacted with outliers resulting from a pair with Computer having the lower r values, it doesn't undermine the importance of this skill in

the new age of health care. A study shows that respondents had favourable opinions about computerization, as it helps lessen paperwork for nurses and making sure of the effectiveness of nursing care [22]. In some cases, computer course taught in English language among non-English native even helped the students improve their vocabulary and presentation skills [23]. Nevertheless, the three courses were of such importance to the students, as their mean score in their final grades shows above passing mark ( $\geq 50$ ) aside from some failures that caused some of the outliers.

It can also be seen in the results that the mean scores of their final grades have increased over the years. General improvement in the mean scores for all three courses may indicate potential improvements in the curriculum and instructional strategies given by CON. Curricula creation is a crucial aspect of education, encompassing nearly all individuals involved in the process [24]. Although these strategies may not be proven in this study, curriculum modification by the nursing program must emphasize the connections between the courses and better align them. Better teaching techniques will also help to improve student learning and engagement, through faculty members incorporating more effective teaching methods. The use of case studies, simulations, or active learning techniques can make the courses more engaging and relevant. Interactive teaching methods would be advantageous to encourage stronger communication between teachers and students [25]. This can lead to improved academic performance because of enhanced student motivation.

Henceforth, it is recommended based on the study that Tobruk University improve its nursing program through curriculum alignment enhancement. Incorporating active learning strategies while integrating technology and providing faculty development opportunities through mentorship programs would be beneficial [26]. The program should also make sure that evaluation techniques complement learning goals and offer prompt feedback to enhance performance. Future researchers should include tracking students' academic performance over time while exploring their perceptions of the courses to identify best practices and areas for improvement.

## 5. Conclusion

The study explores the correlation among three CON courses at Tobruk University. It includes Computer, Communication Skills, and Epidemiology offered at their 3<sup>rd</sup> school year level. The research presented the Pearson product correlation coefficient between pairs of courses to gauge its association and significance. The results revealed a mostly high positive correlation across the three AY where batch 2022-2023 has the highest recorded ( $r > 0.8$ ), while batch 2023-2024 has the highest mean ( $> 71.69$ ) and the most balanced correlation among pairs of courses ( $r > 0.725$ ).

In summary, this study offers insightful information about the connections between Computer, Communication Skills, and Epidemiology courses in Tobruk University's nursing program. According to the findings, a comprehensive approach to nursing education is necessary. Enhancing the curriculum and implementing ongoing assessments are essential for preparing students for the demands of the workforce.

For future research the following maybe useful:

1. Before conducting any major changes, conduct a thorough needs assessment, this should survey and interviews

nursing students, faculty, and local healthcare professionals.

2. Create realistic simulations of epidemiological investigations that require students to use computer skills for data management, communication skills for team collaboration, and epidemiological knowledge for problem-solving.
3. Create a curriculum framework that explicitly connects computer skills, communication skill, and epidemiology.
4. Invest in necessary technology, such as updated computer labs and epidemiological software, and provide training for both students and faculty.
5. Focus on practical application through simulations, case studies, and community based projects.

## 6. Future Suggestions

As a suggestion for future researchers of similar studies, integrating computer science, communication skills, and epidemiology in nursing education is essential for preparing future nurse to navigate the complexities of modern healthcare. Developing interdisciplinary course that combined these fields can equip students with competencies needed to analyze epidemiological data using digital tools and effectively communicate findings to diverse audiences, simulation based education, including the use of extended reality technologies, offers student opportunity to practice patient interactions in controlled environment, thereby enhancing their communication skill and confidence before entering clinical settings. Emphasizing digital health competencies with the curriculum ensures that students are proficient in utilizing technology for patient care and data management, aligning with the increasing digitalization of healthcare systems. Finally, fostering continuous professional development through lifelong learning modules keeps nursing professionals updated on technological advancement and communication strategies in epidemiology, ensuring they remain adept in an evolving healthcare landscape, by adopting these strategies nursing education can produce professionals skilled in technology, and effective in communication skill. Ultimately leading to improved patient outcomes and more efficient health care system.

## **Declarations**

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This study did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

### **Competing Interests Statement**

The authors declare that they have no conflict of interest.

### **Consent for publication**

The authors declare that they consented to the publication of this study.

### **Authors' contributions**

Contribution is equal among authors.



### Ethical approval and consent to participate

The study was conducted with ethical principles followed. This includes informed consent, data confidentiality, and anonymity of the participants involved in the study. University and research ethics guidelines were considered and followed in data gathering and analysis.

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